

What is claimed is:

1. A method of configuring a radio frequency identification (RFID) device antenna structure, the method comprising:
 identifying a low-current-flow portion of an antenna layout proposed for the antenna structure; and
 placing a high effective resistance region in the low-current-flow portion, and low effective resistance regions in other portions of the antenna layout.
2. The method of claim 1, wherein the identifying includes numerically simulating performance of the antenna layout.
3. The method of claim 2, wherein the numerically simulating includes simulating performance under the assumption of the antenna layout having substantially uniform conductivity.
4. The method of claim 2, wherein the identifying includes identifying the low-current-flow portion as a portion having a current flow below a threshold current value.
5. The method of claim 4, wherein the threshold current is a predetermined percentage of a maximum current flow determined in the numerically simulating.
6. The method of claim 1, wherein the placing includes placing the low effective resistance regions so as to substantially fully surround the high effective resistance region.
7. The method of claim 1, wherein the low effective resistance regions are thicker than the high effective resistance region.
8. The method of claim 1, wherein the low effective resistance regions have an uneven thickness.

9. The method of claim 1, wherein the low effective resistance regions have a stacked structure, with a pair of conductive layers separated in part from one another by an intervening insulator layer.

10. The method of claim 9, wherein the conductive layers each include multiple discrete conductors.

11. The method of claim 10, wherein the discrete conductors each have a substantially circular cross section.

12. The method of claim 2, further comprising numerically simulating performance of a modified antenna layout having the low effective resistance and high effective resistance regions.

13. The method of claim 12, further comprising comparing the simulated performances of the antenna layouts with one another, to thereby examining the effect of introducing the high effective resistance regions.

14. The method of claim 1, wherein the high effective resistance regions are substantially free of conductive material.

15. A radio frequency identification (RFID) device comprising:
a substrate;
an antenna structure on the substrate, wherein the antenna structure includes:
a low effective resistance region; and
a high effective resistance region having an electrical conductivity less than that of the low effective resistance;
wherein the low effective resistance region substantially fully surrounds the high effective resistance region; and
an RFID strap operatively coupled to the antenna structure.

16. The device of claim 15, wherein the high effective resistance region is located such that, if the high effective resistance region had the same conductivity as the low effective resistance region, the high effective resistance region would have a lower current flow than the low effective resistance region.

17. The device of claim 15, wherein the high effective resistance region includes at least about 10% of the antenna layout.

18. The device of claim 15, wherein the high effective resistance region is substantially free of conductive material.

19. The device of claim 15, wherein the wherein the low effective resistance region is thicker than the high effective resistance region.

20. The device of claim 15, wherein the low effective resistance region has an uneven thickness.

21. The device of claim 15, wherein the low effective resistance region has a stacked structure, with a pair of conductive layers separated in part from one another by an intervening insulator layer.

22. The device of claim 21, wherein the conductive layers each include multiple discrete conductors.

23. The device of claim 22, wherein the discrete conductors each have a substantially circular cross section.

24. The device of claim 15, wherein the low effective resistance region includes conductive ink.

25. The device of claim 15, wherein the low effective resistance region includes plated conductive material.

26. A radio frequency identification (RFID) device comprising:
a substrate;
an antenna structure on the substrate, wherein the antenna structure with one or more antenna elements having a regular shape, where the antenna structure includes:

a low effective resistance region; and
a high effective resistance region having an electrical conductivity less than that of the low effective resistance; and
an RFID strap operatively coupled to the antenna structure.

27. The device of claim 26, wherein the regular shape is a polygonal shape.

28. The device of claim 26, wherein the regular shape is a rectangular shape.

29. The device of claim 26, wherein the high effective resistance region is located such that, if the high effective resistance region had the same conductivity as the low effective resistance region, the high effective resistance region would have a lower current flow than the low effective resistance region.

30. The device of claim 26, wherein the high effective resistance region includes at least about 10% of the antenna layout.

31. The device of claim 26, wherein the high effective resistance region is substantially free of conductive material.

32. The device of claim 26, wherein the wherein the low effective resistance region is thicker than the high effective resistance region.

33. The device of claim 26, wherein the low effective resistance region has an uneven thickness.

34. The device of claim 26, wherein the low effective resistance region has a stacked structure, with a pair of conductive layers separated in part from one another by an intervening insulator layer.

35. The device of claim 34, wherein the conductive layers each include multiple discrete conductors.

36. The device of claim 35, wherein the discrete conductors each have a substantially circular cross section.

37. The device of claim 26, wherein the low effective resistance region includes conductive ink.

38. The device of claim 26, wherein the low effective resistance region includes plated conductive material.

39. A method of configuring a radio frequency identification (RFID) device antenna structure layout, the method comprising:

selecting an initial antenna structure layout, wherein the initial antenna structure layout includes a conductive element of conductive material, wherein the conductive element has a regular shape; and

changing the effective resistance of a portion of the conductive element.

40. The method of claim 39, wherein changing includes removing substantially all of the conductive material from the portion.

41. The method of claim 39, wherein the changing includes thinning the conductive material in the portion.

42. The method of claim 39, wherein the changing includes configuring the conductive element to have a low effective resistance portion and a high effective resistance portion.

43. The method of claim 39,
wherein the portion is a portion of the initial antenna structure layout where low current flow is expected, relative to other parts of the conductive element; and
wherein the changing includes increasing effective resistance in the portion.

44. The method of claim 43, wherein the portion is substantially fully surrounded by other portions of the conductive element.

45. A method of reducing cost of radio frequency identification (RFID) devices, the method comprising:

selecting an initial antenna structure layout, wherein the initial antenna structure layout includes a conductive element of conductive material; and
modifying a portion of the conductive element initial antenna structure layout to produce a modified antenna structure layout having a reduced cost associated therewith.

46. The method of claim 45, wherein the conductive element selected has a regular shape.

47. The method of claim 45, wherein the portions is substantially surrounded by other parts of the conductive element.

48. The method of claim 45, wherein the modifying includes removing substantially all of the conductive material from the portion.

49. The method of claim 45, wherein the modifying includes thinning the conductive material of the portion.

50. The method of claim 45, wherein the modifying includes changing the conductive material of the portion.

51. The method of claim 45, wherein the modifying includes changing the effective resistance of the portion.

52. The method of claim 45,
further comprising, prior to the modifying, simulating performance of the initial antenna structure layout;
wherein the modifying includes selecting the portion based on results of the simulating.

53. The method of claim 52, wherein the selecting includes selecting based on current flow in the initial antenna structure layout predicted by the simulating.